TERATOLOGICAL FORMS OF CITRUS FRUITS*

By S. B. Parish

Malformations as remarkable as are some of those which have been described and figured in the pomes, notably the pear, do not appear to have been noticed in the hesperidiums. But while these curious forms are of merely scientific interest, and are without economic importance, among oranges and lemons those most commercially valued are, teratologically considered, mere monstrosities.

The best lemons are varieties which habitually abort the ovules, and, therefore, bear seedless fruits, which are, for that very reason, preferred to those which are perfect and seed-bearing. There are also other, and objectional deformities to which the lemon is subject. The simplest of these is a roughening and thickening of parts of the rind, causing elevated longitudinal ribs, or sections, of greater or less breadth.

Occasionally the carpels themselves are more or less atrophied. This results in such forms as *d* and *e* in the accompanying figure, in which the vestiges of the carpels are contained in the bulb-like extremities of the fruit. In *f* and *g* are shown forms of still further degeneracy, in which the carpels have entirely disappeared, only the pericarp remaining, which is further deformed by fission.

Syncarpy, one of the commonest teratological conditions in fruits, is often exhibited by lemons. In specimens which have come under my observation it was confined to the coherence of only two individuals, but it is probable that a larger number may sometimes be involved. In some cases the coalesence is so complete that the proper outline of the fruit is little affected; more commonly the union is incomplete. Usually one member is not fully developed, as *a* and *c*, or both may be only imperfectly developed, as shown in *b*. Syncarpy also occurs in the orange, but more rarely than in the lemon.

The most esteemed varieties of the orange are also those which abort the ovules, and produce seedless fruit. This is the case with the navel, the choicest orange grown in California, which exhibits, in addition, a more pronounced teratological modifica-

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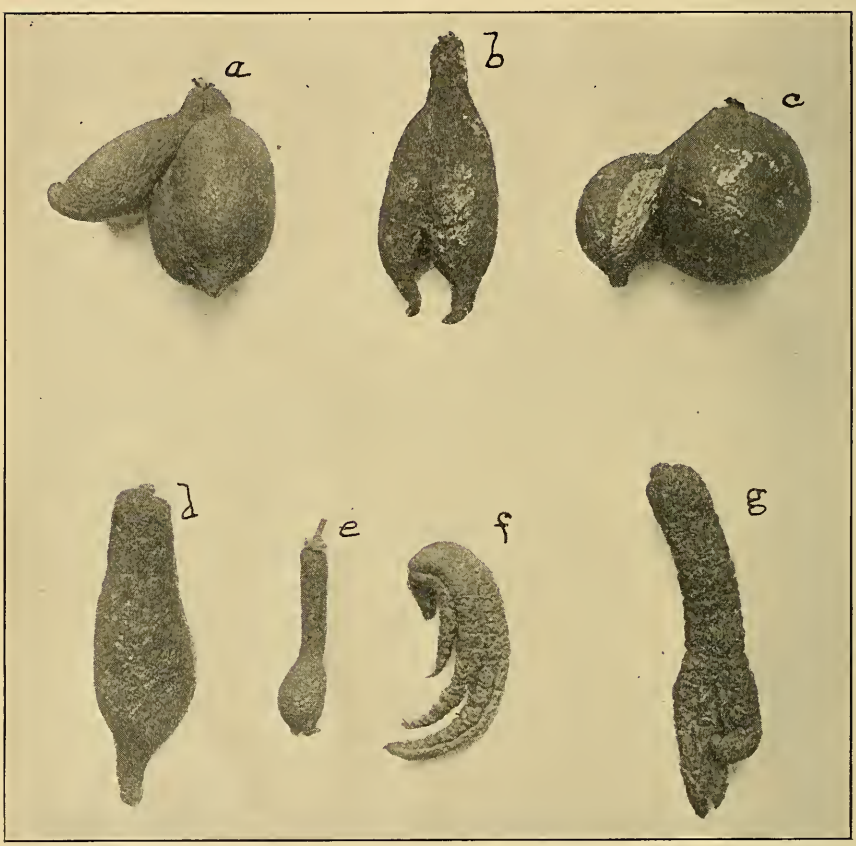
tion. A navel is, in reality, the consolidation of two oranges, one rudimentary, whose atrophied remains occupy the distal extremity of the developed fruit. In the market are found only specimens in which the abortive orange is merely vestigial, and is entirely included within the rind of the developed one, its pres-



Syncarpy, atrophy, and fission in lemons.

ence being indicated by a small orifice, the so-called "navel." But among the "culls," which are rejected in packing, may be found abundant examples in which the secondary orange is more nearly normal, and is often more or less, occasionally entirely, exterior to the other. It may even contain a few reduced carpels with juicy cells, but is always wrinkled and corrugated. In other

cases it takes the form of a cornute projection, which may be two or three inches in length.

However small the "navel" orifice may be it is point of weakness in the rind of the orange, and renders it peculiarly liable to "splitting." This is a term applied to the opening of fissures in the pericarp, whereby germs of decay are admitted to the interior. Orchardists are not agreed as to the causes which produce the tension within the orange, but the resultant ruptures often occasion a large percentage of loss in the crop.

San Bernardino, California

THE FATE OF A VIOLET, OR THE BENEFIT OF CLEISTOGAMY

By E. J. Hill

The efficacy of cleistogamy in the preservation of a species under adverse conditions of environment was well shown by a case which came under my observation a few years ago. The area now comprised in Hamilton Park, one of the smaller parks of Chicago, is but a block from where I have lived since 1885, and was familiar ground for botanical study and collecting for ten years previous. It was in part undisturbed prairie; in part wooded by a scattered growth of oaks and shrubs in the dryer portion. There was a low ridge of sand forming the southern part of the area, with an herbaceous flora common to low sand dunes. The remainder was wet or wettish prairie in which the sand was mixed with humus a foot or more in depth, making a black soil resting on the pure sand of the old lake bottom, akin to that of the low ridge. The property being for a long time in litigation was nearly all left vacant until used for the park, while the grounds contiguous had been largely taken for dwellings. The making of streets and construction of sewers served to drain the wet sections, and as commonly happened in such cases some of the plants of the dry ground moved into the drained portion to associate with, or supplant, the less resistant original occupants; and plots where *Cypripedium candidum*, *Viola blanda*, *V. lanceolata*, and the like once flourished were taken by *Phlox bifida*, *Viola pedata*, and their associates. The last mentioned did this